Making bigleaf maple syrup: A hobbyist's guide

Peter Matzka, Sarah Cameron, Melanie Douville, Eric T. Jones, Carrie Berger and Tiffany Hopkins

CONTENTS

Bigleaf maple versus sugar maple: What is the difference?

Tapping trees and collecting sap (maple sugaring)

Turning maple sap into maple syrup

Additional resources

Bigleaf maple (*Acer macrophyllum*) is the most prevalent maple in the Pacific Northwest.

Credit: Eric T. Jones, © Oregon State University

Maple syrup, produced from maple tree sap, is one of North America's oldest sweeteners. All maples — plus a few additional tree species like birch, walnut and beech — produce sugary, dormant season sap that can be reduced to syrup by evaporating off water through boiling. This includes bigleaf maple (*Acer macrophyllum*), the most prevalent maple in the Pacific Northwest.

This publication provides the basic steps for making bigleaf maple syrup for personal use. Although the process is similar to traditional sap-harvesting and sugaring methods used in the northeastern North American maple syrup industry, the techniques described in this publication help ensure a successful experience for small producers tapping bigleaf maples in the environmental conditions of the Pacific Northwest. If you are interested in commercial production, see "Additional resouces" (https://extension.oregonstate.edu/catalog/em-9163-making-bigleaf-maple-syrup-hobbyists-guide#additional-resources) for information on vacuum tubing, reverse osmosis systems and syrup sales under Oregon's Farm Direct Marketing Law.

Bigleaf maple versus sugar maple: What is the difference?

Sugar maple (*Acer saccharum*), native to the northeastern United States (Minnesota and states eastward, and south to Missouri) and eastern Canada, has traditionally been the most commonly used tree in maple sugaring.

Bigleaf maples are one of several maple species native to the Pacific Northwest and can be identified by their large, palmately lobed leaves spanning 12 inches and larger in diameter when mature. The primary native range of bigleaf

maple is west of the Cascade Mountains and Vancouver Island, though pockets are found in the Sierras and parts of western Idaho.

Sugar maples are named for the high sugar content in their sap relative to most other maple species. Sugar maple sap averages 1.25 to 2.5 Brix (1 Brix = 1% sugar in a solution), whereas bigleaf maple sap averages 1.0 to 1.5 Brix. The sugar content determines how much sap is required to make a gallon of syrup. For instance, it takes approximately 80 gallons of one Brix sap to make 1 gallon of syrup, whereas it would only take 40 gallons of 2.0 Brix sap. Without the use of equipment like reverse osmosis to efficiently remove water, the lower sugar content significantly increases the amount of time, labor and energy required to reduce sap to syrup.

Bigleaf maple has a more intermittent sap collection season, on average, than sugar maple. This reflects the different weather patterns and climate conditions of its native range.

Below-freezing nights and above-freezing days create the conditions for sap flow in maples. In the Pacific Northwest, freeze-thaw cycles can be sporadic throughout winter and vary significantly by elevation and exposure. Therefore, sap flow overall in the Pacific Northwest is less consistent and predictable compared to the Northeast. This, along with the average lower sugar content of bigleaf maple sap, is why there historically have not been many commercial bigleaf maple syrup producers.

However, advancements in maple sugaring knowledge and technology in recent decades, such as reverse osmosis and vacuum tubing sap collection systems, have made commercial sugaring more economically viable in the Pacific Northwest. This is not to say you can't collect sap and make syrup without this technology. Simple systems like bucket setups are ideal for beginning hobbyists, family fun, and educational programs due to their low cost, easy-to-use nature.

Despite the challenges of bigleaf maple sugaring for hobbyists, the procuring of maple sap is a fun outdoor activity and the end product is so delicious, that it is worth the effort.

Batch to batch, maple syrup can have a unique color and taste based on these variables:

- The concentrations of micro and macronutrients in the soil.
- Your skill at keeping raw sap free of bacteria.
- The starting Brix and length of time the sap is boiled.

Sensory characteristics like butterscotch and caramel notes abound in the robust flavor of bigleaf maple syrup. In addition to the pleasing flavor, maple syrups contain beneficial minerals such as potassium, calcium, magnesium, manganese, iron and zinc.

Tapping trees and collecting sap (maple sugaring)

Tree sap consists mostly of water, along with dissolved minerals, vitamins, amino acids and sugars. Sugars are naturally produced as trees photosynthesize during the growing season. Photosynthesis is the process of using sunlight to synthesize foods from carbon dioxide and water. During the growing season, sap moves from the roots of the tree up the trunk through the sapwood to provide water and nutrients to various parts of the tree.

The bigleaf maple sap collection season begins after the leaves have fallen and typically after at least one hard freeze in late fall or early winter.

During the tree's dormant period, some stored sugars (in the form of starch) are hydrolyzed and released into the sap. The dissolved sugars help protect the tree by keeping air bubbles in the tree's vascular system small so they do not form ice crystals that can damage the tree.

Freezing temperatures create a negative internal vacuum, pulling water from the soil up into the tree where it becomes sap. As the temperature warms, positive pressure is created in the trunk and crown, which through gravity forces sap downward. If the tree has a taphole and the conditions are right, some sap in the tree will escape out the taphole. The sap flow quantity and quality will depend on weather conditions, ground moisture and other variables such as crown exposure to the sun.

Discontinue sap collection once buds burst with flowers and leaves in early spring. Sap collected after this point will have an "off-flavor."

Before tapping, gather the following supplies:

- 5/16-inch (most common) or 1/4-inch spile (also known as taps or spouts). If you are hanging a pail, then you need the style with a hook.
- Stainless steel drill bit to match the barrel size of your spile (avoid cobalt, as the coating is toxic).
- Drill (cordless is most efficient for precise tapholes).
- Lightweight hammer.

If using the bucket method:

- Spile with a barb for attaching the tubing.
- Maple industry or other food-grade tubing (if using the bucket approach).
- A food-grade pail or bucket.
- A tight-fitting bucket lid with a 5/16-inch hole drilled into it to slip the tubing through.

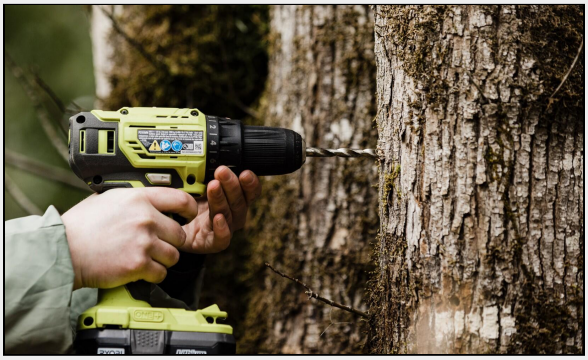
When the temperature drops to below or near-freezing, sap is sucked up the tree from the roots.

Credit: Melanie Douville, © Oregon State University

As temperatures rise, the sap falls back down to the roots, some escaping through the tap hole.

Credit: Melanie Douville, © Oregon State University

How to tap a bigleaf maple



Step 1. Drill the spile hole into the tree at a slightly upward angle. Scrap away excess bark or mass if necessary. The hole depth should be 1 1/2 to 2 inches.

Credit: Erin Riddle, KLiK Concepts

Step 2. Tap the spile into the tree with a hammer to ensure a snug fit.

Credit: Erin Riddle, KLiK Concepts

Step 3 (Tube and bucket). Attach bucket tubing onto the spile.

Credit: Eric T. Jones, © Oregon State University

Step 3 (Hanging pail). Fasten pail and lid onto the spile.

Credit: Erin Riddle, KLiK Concepts

Step 4. Collect fresh sap daily. Sap will run clear and watery when fresh.

Credit: Erin Riddle, KLiK Concepts

Once weather conditions are right for tapping, drill a hole into the trunk of the tree at a comfortable working height. You may want to use a hammer claw or other scraper to gently remove some of the dirty outer bark to help prevent contamination of the taphole.

You can angle your hole slightly upward into the tree so gravity will help move the sap out of the spile and into your collection container.

The diameter of your drill bit should be equivalent to that of the barrel of your spile, 5/16-inch or 1/4-inch. Hold the drill firmly to create a precise, circular hole 2 inches deep with a sterile bit. Gently remove all the shavings you can with a sterile bottle brush.

Avoid introducing microorganisms into the taphole with dirty tools or by blowing air to clear wood shavings. This may cause microbial contamination resulting in the taphole sealing faster.

Firmly tap the spile into the hole with a hammer. The fit should be snug, but be careful not to use excessive force. Too much force can split the wood, bend the spile, or cause the barrel to hit the end of your hole and cut off sap flow. Wrist strength is generally all you need.

Commercial production

Commercial maple sugaring in the Pacific Northwest uses vacuum pumps and tubing. Using vacuum in your sap collection can significantly enhance sap flow without harming the tree. Hobbyists can get these pump benefits by using a relatively inexpensive small AC- or DC-powered self-priming potable water pump that can run dry, like those used in recreational vehicles. The pump is connected to barbed spiles on multiple trees using vacuum tubing. When the pump is turned on, it creates a vacuum that pulls sap through the pump and into a food-grade collection tank. See "Additional resources" for more on vacuum systems.

Do not be discouraged if a tree doesn't produce sap. It's not uncommon to have a few that aren't producers in some sugaring seasons. The more trees you tap, the better your odds of getting good producers.

In the Northeast, people traditionally hung a pail on the spile. A hanging pail will work in the Pacific Northwest, and it is a low-cost way to try tapping. But our warmer climate causes less predictable sap flow, and the pail approach can be less reliable than it is in the Northeast.

Another approach for hobbyists is to use tubing to drain sap from a tap to a sealed food-grade bucket placed on the ground. Maple equipment suppliers sell a specialized food-grade UV-protected tubing; 5/16-inch is the optimal size for a bucket system. Attach the tubing to the spile and put the other end through a hole drilled in the bucket lid.

Do not use single-use plastics like milk jugs, as they can shed microplastics into your sap. Additionally, it's hard to keep flying insects from hanging pails or bags. On warm and sunny winter days, flying insects will emerge and get into the sap if the lids on your collection containers are not tight.

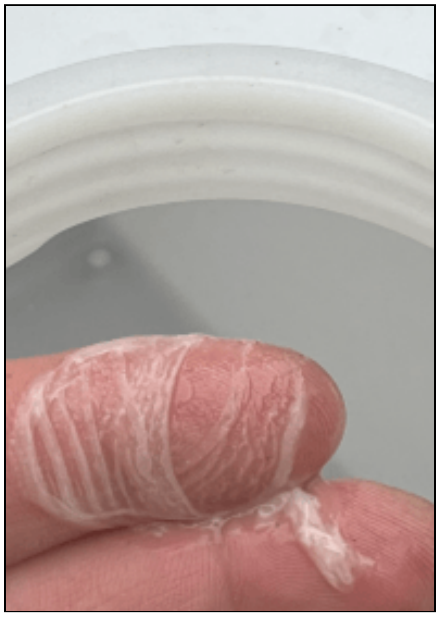
When the sap is flowing (after a freeze-thaw event), collect it daily. If the day is particularly warm, you may need to collect your sap more than once daily. Or, you can put clean, food-grade ice packs in your buckets to help keep the sap chilled. Once sap leaves the tree, bacteria and potentially fungi will begin to grow. Fresh, raw sap spoils easily because bacteria feed on sap nutrients. The faster you process it into syrup, and the cleaner you maintain your equipment, the better your end product will be.

Avoid storing sap for more than 24 hours in a refrigerator for later processing, because bacterial growth will begin to turn the sap sour. In very spoiled sap, the bacterial growth will form a “ropey” texture. It is difficult to observe this process since the sap can appear clear for days. The consequences of not practicing good sanitation in your sap collection and processing risks bacterial contamination and biofilm throughout your system. Your goal is to control bacterial growth by cleaning surfaces frequently.

An acid-based cleaning product like Star-San is recommended for surface sanitizing because it is tasteless and approved for contact with food. For deeper disinfecting of surfaces, you may need to use a product like 3%–6% food grade hydrogen peroxide. For all cleaning agents, carefully follow the manufacturer’s directions and safety precautions. Keep a duplicate set of clean containers in reserve to improve efficiency.

A contaminated spile that must be replaced.

Credit: Eric T. Jones, © Oregon State University



Biofilm detected on a sap collection tank.

Credit: Eric T. Jones, © Oregon State University

Extremely ropey sap poured through a 100 mesh kitchen strainer.

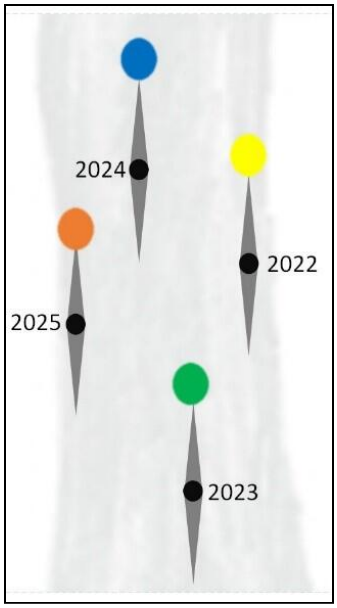
Credit: Eric T. Jones, © Oregon State University

If you do not have enough sap to make a batch of syrup, you can reduce it (by boiling or reverse osmosis) to a measurement of 5–8 Brix or higher and then freeze it (see resources below for information on measuring Brix). Freezing unconcentrated sap is not recommended because it requires excessive freezer space and significantly more energy to thaw properly and promptly, increasing the risk of spoilage compared to concentrated sap.

When you are ready to turn this frozen concentrate into syrup, remember that the higher the Brix, the faster it will thaw. This is important because the concentrated sap must be melted quickly in a kettle to prevent the growth of bacteria and yeasts. If you let it melt naturally outside in the sun, spoiling will set in quickly.

Once the sap stops flowing, pull your spiles and clean them along with the tubing.

A tree can be tapped more than once in a season, but less is better because every tap creates a wound the tree will need to heal. Create a tapping pattern and track it by spraying a small amount of tree paint just above or below your previous taphole. Move either clockwise or counterclockwise a few inches over and alternating 8–12 inches up or down with each new hole. Do not apply sanitizing chemicals like bleach or hydrogen peroxide to the tapholes at any point, as it can hinder the tree's natural healing. The best approach to taphole hygiene is to keep your tools and spiles clean and allow the tree to heal naturally.



Track the tapping pattern by spraying paint by your previous taphole.

Credit: Eric T. Jones, © Oregon State University

Excess water is boiled from sap using a large, stainless steel kettle.

Credit: Eric T. Jones, © Oregon State University

Turning maple sap into maple syrup

Making syrup requires a separate set of supplies from collecting sap. We recommend you look for videos, websites and other publications on hobby tapping to see the range of approaches people use to make syrup. This research will help you decide which equipment you may already have that can work and what you need to acquire. One approach includes boiling only, which may not be feasible for larger batches of sap.

You will need:

- Large stainless-steel trays or a kettle.
- A stove.
- Filter paper.
- A funnel.
- A candy thermometer or high-temperature Brix hydrometer.
- Glass containers to store the syrup.

Here are the steps to make small-batch syrup:

1. Boil the excess water from the sap. It takes time to boil the sap into syrup. The more sap you have, the longer it will take. For reference, 20 gallons of 1 Brix bigleaf maple sap will produce approximately 4 cups or 1 quart-sized glass Mason jar of syrup. This process will take approximately eight hours of boiling in a round kettle and six hours in a flat pan like a steam tray.
2. Continue evaporating the sap until it takes on the consistency of syrup. At this point, there are two methods for determining when your syrup is ready.
    1. Using a candy thermometer, check the temperature and finish the boil when it reaches 7° F above the boiling point of water. *The boiling point of water differs based on your elevation. At sea level, the syrup is finished at 219° F.*
    2. A glass syrup hydrometer is the most accurate instrument and is a worthwhile investment if you are going to make syrup regularly. Note that there are two red lines indicating the syrup has reached 66.8 Brix, one for cold sap and one designed for hot sap. Using a Brix hydrometer, boil until the syrup reaches 66.8 Brix.
3. When your syrup cools, it will precipitate out excess minerals or “sugar sands.” Traditionally, syrup is filtered through a special filter that you can purchase from a maple equipment supplier. If you are making a small batch, you may want to simply cool the syrup in your refrigerator and then pour off the clear syrup on top into a clean jar and refrigerate.

4. Bottling is the last step in making maple syrup and should always be done indoors in a sanitary environment, typically a kitchen. To prevent mold growth, you must bottle syrup between 180° F and 190° F. This is called “hot packing.” Pour syrup using a sterile funnel into washed, hot jars just sterilized in a boiling water bath. This will help keep the syrup and bottle at the 180° F minimum temperature. Seal the bottles with a washed screw cap and then lay the bottles on their sides to sterilize the caps. If the bottled and capped syrup stays at 180° F for three minutes, you should see no mold growth. Syrup bottled properly is shelf-stable at room temperature. Once opened, the syrup will be exposed to mold spores in the air. Refrigerate after opening to extend the shelf life by months.

Credit: Melanie Douville, © Oregon State University

Additional resources

- Procuring and processing maple and walnut syrup in compliance with Oregon’s farm direct marketing law (https://extension.oregonstate.edu/catalog/em-9588-procuring-processing-maple-walnut-syrup-compliance-oregons-farm-direct-marketing)
- OregonTreeTappers (https://www.oregontreetappers.net/research/osu-research-program)
- Oregon Maple Project (https://www.oregonmapleproject.org/)
- *Bigleaf Sugaring: Tapping the Western Maple*, by Gary and Katherine Backlund (https://www.oregontreetappers.net/hobbyist/hobbyist-resources)
- Maple Syrup Production Beginner’s Notebook, Cornell Maple Program (https://blogs.cornell.edu/cornellmaple/for-beginners/)
- MapleResearch.org (https://mapleresearch.org/)
- North American Maple Syrup Producer’s Manual, 3rd edition (https://mapleresearch.org/pub/manual/)

About the authors

Peter Matzka (https://extension.oregonstate.edu/people/peter-matzka)

Forestry Outreach Coordinator

Sarah Cameron (https://extension.oregonstate.edu/people/sarah-cameron)

Forestry Program Assistant

Melanie Douville
Graduate Research Assistant
Oregon State University

Eric T. Jones
Principal Investigator, OSU Maple Sugaring Project
Oregon State University

Carrie Berger (https://extension.oregonstate.edu/people/carrie-berger)
Fire Program Manager

Tiffany Hopkins (https://extension.oregonstate.edu/people/tiffany-hopkins)
(Former)

Related publications

Credit: Dan Lanovaz / CC BY-NC-SA (Cropped from original)

Procuring and processing maple and walnut syrup in compliance with Oregon's Farm Direct Marketing Law (https://extension.oregonstate.edu/catalog/em-9588-procuring-processing-maple-walnut-syrup-compliance-oregons-farm-direct-marketing)

Oregon law allows farmers to turn maple and walnut sap collected on their property into syrup and sell the finished product. Learn how to collect sap, process it into syrup and bottle a true taste of Oregon.

Joy Waite-Cusic, Eric T. Jones, Kelly Streit, Peter Matzka | Sep 2025 | OSU Extension Catalog Peer reviewed (Orange level) (https://extension.oregonstate.edu/peer-review-guidelines)

Credit: Dan Lanovaz / CC BY-NC-SA (Cropped from original)

Procuring and processing maple and walnut syrup in compliance with Oregon's Farm Direct Marketing Law (https://extension.oregonstate.edu/catalog/em-9588-procuring-processing-maple-walnut-syrup-compliance-oregons-farm-direct-marketing)

Oregon law allows farmers to turn maple and walnut sap collected on their property into syrup and sell the finished product. Learn how to collect sap, process it into syrup and bottle a true taste of Oregon.

Joy Waite-Cusic, Eric T. Jones, Kelly Streit, Peter Matzka | Sep 2025 | OSU Extension Catalog Peer reviewed (Orange level) (https://extension.oregonstate.edu/peer-review-guidelines)

Credit: Martinmark (Cropped from original)

Sanitizer basics for the food industry (https://extension.oregonstate.edu/catalog/pnw-752-sanitizer-basics-food-industry)

Cleaning and sanitation are vital for food safety. Build a strong safety culture by training and supporting your team to invest in effective cleaning and sanitizing practices with these tips.

Dave Stone, Jovana Kovacevic, Stephanie Brown | Nov 2024 | OSU Extension Catalog Peer reviewed (Orange level) (https://extension.oregonstate.edu/peer-review-guidelines)

Credit: Martinmark (Cropped from original)

Sanitizer basics for the food industry (https://extension.oregonstate.edu/catalog/pnw-752-sanitizer-basics-food-industry)

Cleaning and sanitation are vital for food safety. Build a strong safety culture by training and supporting your team to invest in effective cleaning and sanitizing practices with these tips.

Dave Stone, Jovana Kovacevic, Stephanie Brown | Nov 2024 | OSU Extension Catalog Peer reviewed (Orange level) (https://extension.oregonstate.edu/peer-review-guidelines)

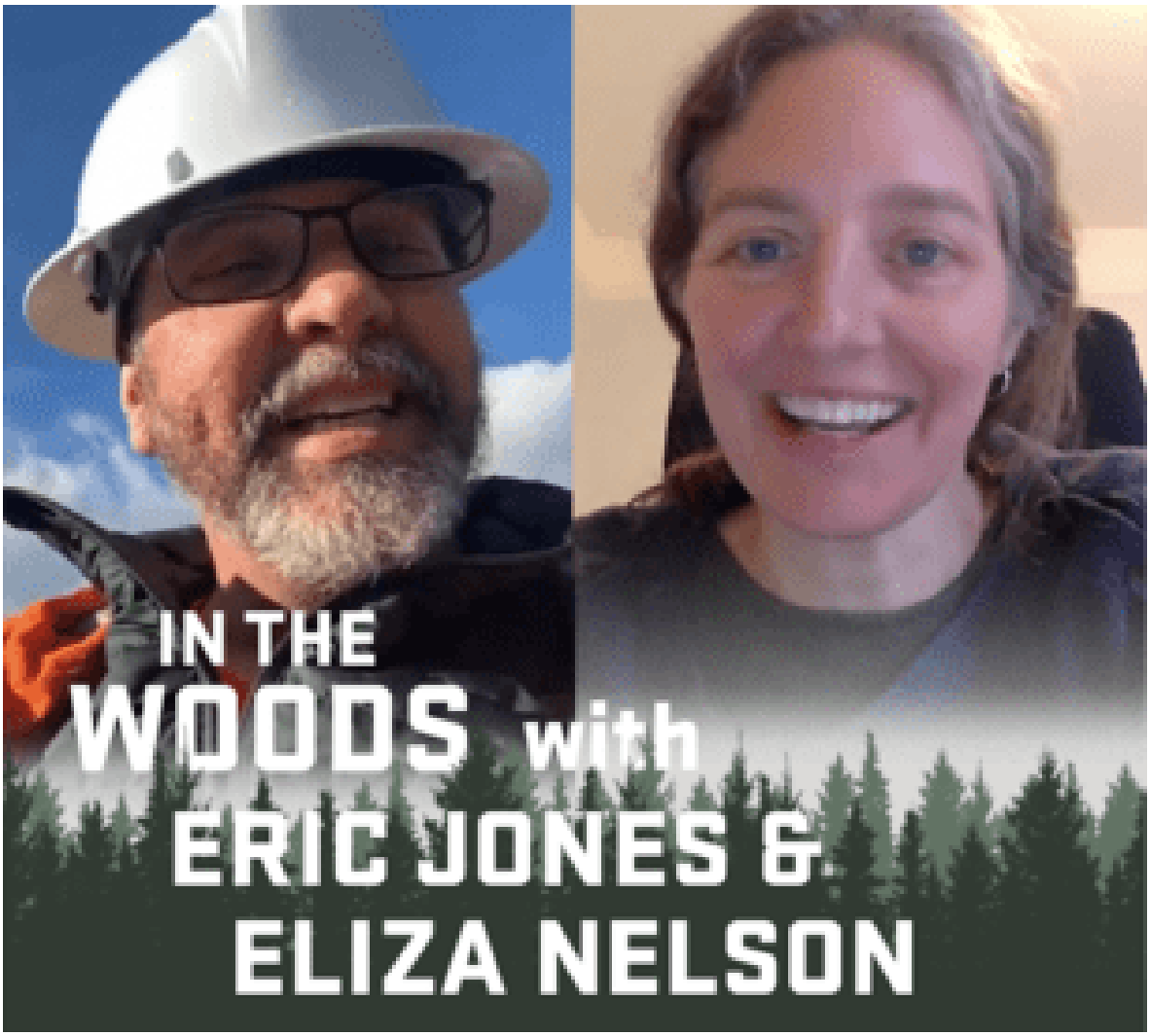


Photo: Christina Friehauf (Cropped from original)

Episode 33: Maple Syrup (https://extension.oregonstate.edu/podcast/woods/episode-33-maple-syrup)

In this episode, Scott Leavengood is joined by Eric Jones and Eliza Nelson to discuss the increasing popularity of maple syrup production in Oregon and the Pacific Northwest.

Scott Leavengood, Eric Jones, Eliza Nelson | May 2023 | Podcast episode

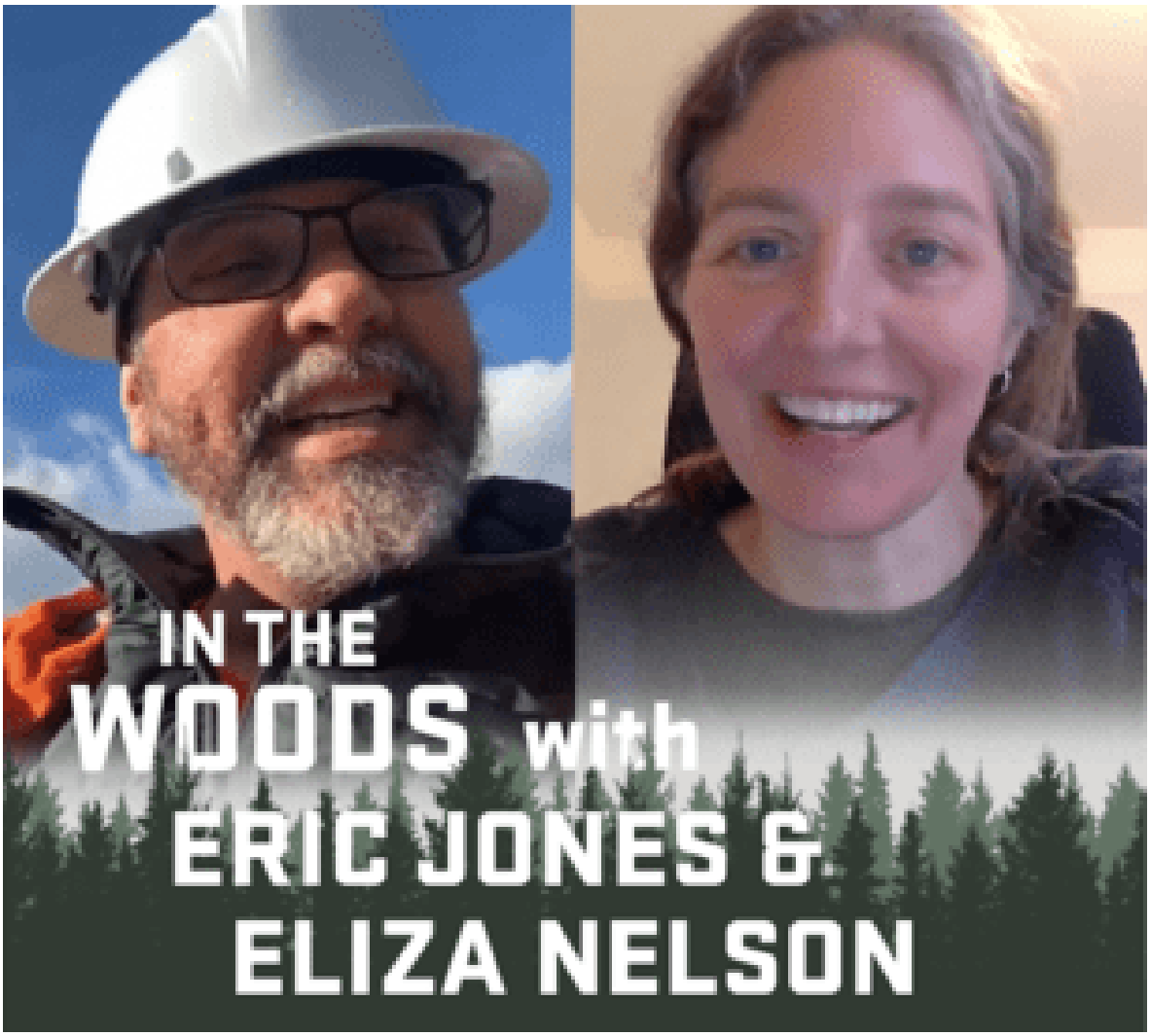


Photo: Christina Friehauf (Cropped from original)

Episode 33: Maple Syrup (https://extension.oregonstate.edu/podcast/woods/episode-33-maple-syrup)

In this episode, Scott Leavengood is joined by Eric Jones and Eliza Nelson to discuss the increasing popularity of maple syrup production in Oregon and the Pacific Northwest.

Scott Leavengood, Eric Jones, Eliza Nelson | May 2023 | Podcast episode

© 2025 Oregon State University. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties. Oregon State University Extension Service offers educational programs, activities, and materials without discrimination on the basis of race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, familial/parental status, income derived from a public assistance program, political beliefs, genetic information, veteran's status, reprisal or retaliation for prior civil rights activity. (Not all prohibited bases apply to all programs.)

Accessibility: This publication will be made available in an accessible alternative format upon request. Please contact puborders@oregonstate.edu or 541-737-3311.